



## Tactical Timing of Low Volatility Equity Strategies

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Many investors we speak to are interested in making a strategic allocation to low volatility equities to help them better meet their investment objectives. The appeal of this strategy is clear. Low volatility stocks have historically delivered higher returns with lower risk than the capitalization-weighted market. Moreover, the behavioral and market-structural forces that have been suggested as possible explanations are inherently hard to change, which means the anomaly might not readily disappear.<sup>1</sup> However, we often hear two tactical concerns about the timing of an allocation. The first is that relative valuation of low volatility stocks may be expensive compared to the rest of the market so they should wait for more attractive levels. The second is that low volatility stocks, which tend to pay higher dividends, may underperform against the back-drop of potential rate increases. In this research note we examine the validity of these concerns by researching drivers of global low volatility equities' performance

relative to the capitalization-weighted index since 1980. We consider valuation as well as the macro-economic backdrop. We find that relative valuation levels have not been a good predictor of low volatility equities' relative return. In addition, while low volatility equities' performance was indeed more sensitive to interest rate changes than the capitalization-weighted index, both delivered similar risk-adjusted returns (Sharpe ratios) in rising-rates environments.

### **Background: Performance Track Record of Low Volatility Investing**

Low Volatility Investing is a broad term that captures a wide range of defensive portfolio construction methodologies, generally resulting in similar performance benefits.<sup>2</sup> The hypothetical Global Low Volatility Portfolio we considered in this analysis invested in a diversified combination of low volatility capitalization-weighted country-sector baskets of stocks included in the MSCI World

Developed Markets Index, e.g. US Financials, UK Telecoms.<sup>3</sup> In earlier research, we have shown this approach to capture the global low volatility effect with less concentration risk and a higher level of liquidity than when using stock specific data, delivering comparable returns.<sup>4</sup> In our analysis, we consider this strategy's performance from 1980 through 1Q 2014.

Low volatility investing has exhibited a strong track record versus the capitalization-weighted market index (Cap-Weighted Index), as shown in Exhibit 1. Since 1980, the Global Low Volatility Portfolio delivered higher returns at lower risk; over the most recent 3 and 5 years, it delivered higher risk-adjusted returns as measured by the Sharpe Ratio. Only in the final year of our analysis period, when the Cap-Weighted Index delivered a strong return with unusually low volatility, did the Global Low Volatility Portfolio underperform while not delivering a risk reduction benefit. Exhibit 2 shows that this result is consistent with past market rallies when low volatility strategies have the highest likelihood of lagging. The silver lining is that low volatility strategies did have positive performance during these time periods.

This performance pattern is not surprising for a more defensive portfolio with a beta of 0.69. It is, in fact, consistent with a particularly attractive feature of low volatility investing: the asymmetry of relative performance. Low volatility equity strategies have avoided more of the downside in falling markets than they have lagged on the upside in rising markets. As illustrated in Exhibit 2, in the worst third of cap-weighted market performance, the Global Low Volatility Portfolio captured only 57% of the downside while in the best third it captured 74% of the upside. This asymmetry helps to explain not only the appeal, but also the long-term cumulative outperformance of low volatility strategies.

## Relative Valuation Does Not Predict Low Volatility Equities Performance

Exhibit 3 illustrates the relationship of the subsequent relative performance of the Global Low Volatility Portfolio to its relative valuation from January 1, 1980 through March 31, 2014, as well as the last 10 years of this analysis period. We note that none of our three valuation metrics, dividend spread (DIV), book-to-price (BP) spread and earnings-to-price (EP) spread, had much efficacy as predictors. Thus, the concern that a current high relative valuation of low volatility stocks presents a sub-optimal environment for allocating to low volatility strategies appears to be unfounded. This result is counter to the common wisdom that valuation levels are significant predictors of future performance; we explore this in more detail in the next section.

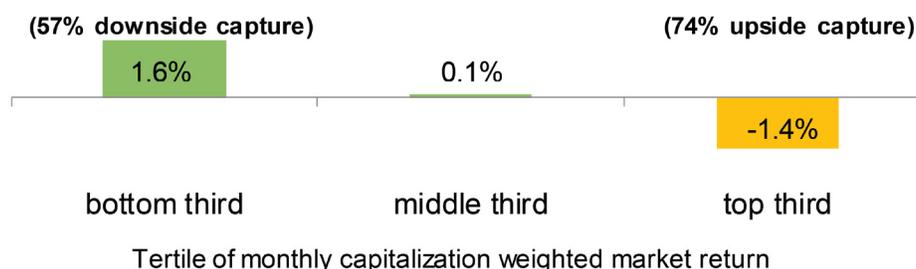
## Drivers of Relative Valuation of the Global Low Volatility Portfolio

Since valuation has historically been a good predictor of stocks' relative performance, it is surprising that it is not a better predictor of the Global Low Volatility Portfolio's relative performance. In trying to understand this, we found that the relative valuation of the Global Low Volatility Portfolio is primarily driven by its dynamic country and sector positioning rather than the valuation changes of static holdings.<sup>5</sup> One clear historical example that illustrates this point is Japan over the period 1980 through 1Q 2014, though other macro effects such as the portfolio's energy sector exposures were important contributors too.

As of March 31, 2014		Since January 1, 1980	10YR	5YR	3YR	1YR
Capitalization-Weighted Equities Index	Return	10.67%	7.44%	18.98%	10.89%	19.69%
	Volatility	15.19%	16.10%	15.77%	14.05%	10.84%
	Sharpe Ratio	0.39	.037	1.20	.77	1.81
Global Low Volatility Portfolio (gross of fees)	Return	12.82%	10.04%	15.49%	10.66%	11.22%
	Volatility	12.12%	11.30%	10.44%	9.96%	10.87%
	Sharpe Ratio	.66	.075	1.47	1.06	1.03

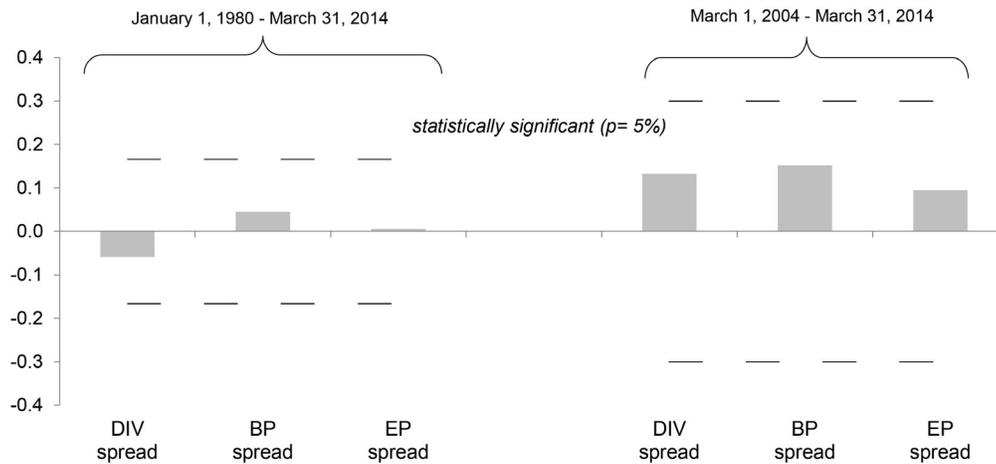
### Exhibit 1: Historical Performance — Global Low Volatility Portfolio and the Cap-Weighted Index

Annualized performance statistics; Sharpe Ratio uses 3-month treasury bills as risk-free rate. Performance shown is of a hypothetical investment strategy, gross of fees, taxes and transaction costs.



### Exhibit 2: Average Monthly Excess Return — Global Low Volatility Portfolio Versus Cap-Weighted Index

Performance in Different Market Regimes: Top, Middle and Bottom Third of Cap-Weighted Index Returns January 1, 1980 — March 31, 2014 Excess returns are versus the Cap-Weighted Index. Performance shown is of a hypothetical investment strategy, gross of fees, taxes and transaction costs.



**Exhibit 3: Predictive Analyses — Quarterly Correlation of excess returns of the Global Low Volatility Portfolio with Relative Valuation Metrics**  
 Excess returns are versus the Cap-Weighted Index. Performance shown is of a hypothetical investment strategy, gross of fees, taxes and transaction costs

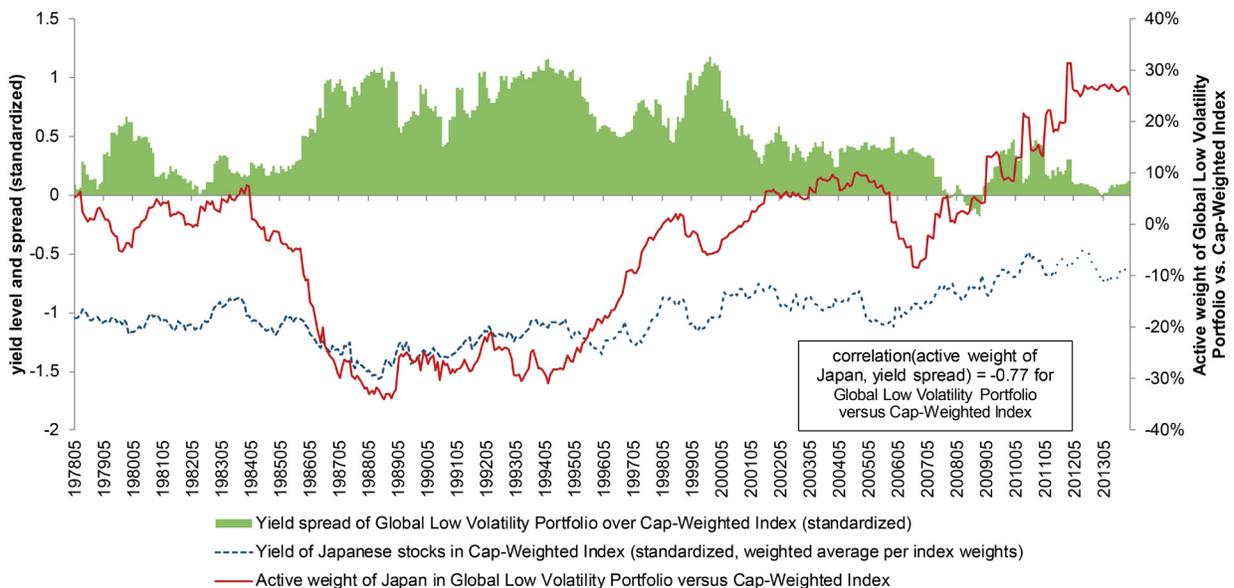
Exhibit 4 shows that Japanese equities have been structurally expensive since the 1980s. Since the advent of the Global Financial Crisis in 2007, Japan has acted as a safe haven with low return volatility. Therefore, the weight of Japan in the Global Low Volatility Portfolio increased, and the portfolio consequently became more expensive (shaded area). Since this shift was primarily caused by macro effects rather than existing holdings having been bid up, we believe this to be less of a concern. We see this as part of a true expression of identifying lower volatility, “safer” assets.

**The Concurrent Macro Environment**

Many investors have predictions about the upcoming macro environment. This raises the question about how low volatility performance relates to its concurrent macro environment, with a rising interest rate environment being of particular interest as many investors expect normalization to higher rates sometime in the future. To answer this, Exhibit 5 shows the correlation of the

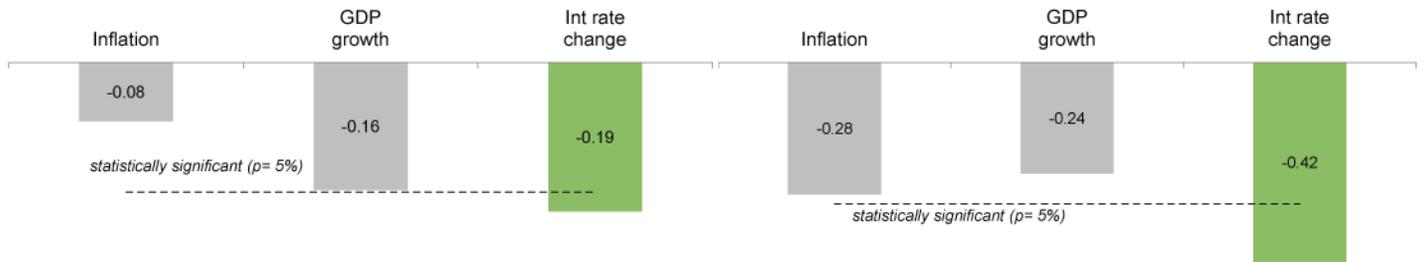
Global Low Volatility Portfolio’s quarterly performance with the change in medium-term interest rates, CPI indicator and global GDP growth during that same period. We see that the portfolio underperformed during economic booms when strong real GDP growth and elevated inflation were accompanied by interest rate increases.

The interest rate environment had the strongest relation to the performance of the Global Low Volatility Portfolio among the economic indicators considered. Exhibit 6 breaks down the Global Low Volatility Portfolio’s relative performance by quarters of increasing and decreasing interest rates. The Global Low Volatility Portfolio’s clearly underperformed the Cap-Weighted Index during periods of rising rates. However, the return difference is not large, 2% on an annualized basis, and the average total return of the Global Low Volatility Portfolio was still above 9%. Moreover, in terms of risk-adjusted returns as measured by the Sharpe Ratio the two were even closer, particularly over the



**Exhibit 4: Yield Spread — Global Low Volatility Portfolio versus Cap—Weighted Index and Japan**

Source: Authors’ calculations.



**Exhibit 5: Sensitivity Analyses — Quarterly Correlation of the Global Low Volatility Portfolio’s Excess Return with Macro Environment**

Excess returns are versus the Cap-Weighted Index. Performance shown is of a hypothetical investment strategy, gross of fees, taxes and transaction costs.

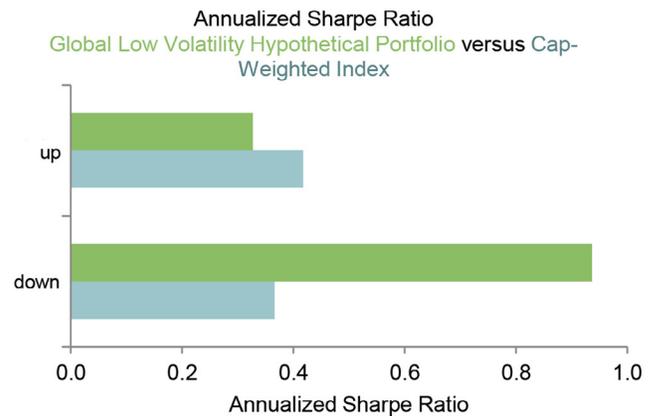
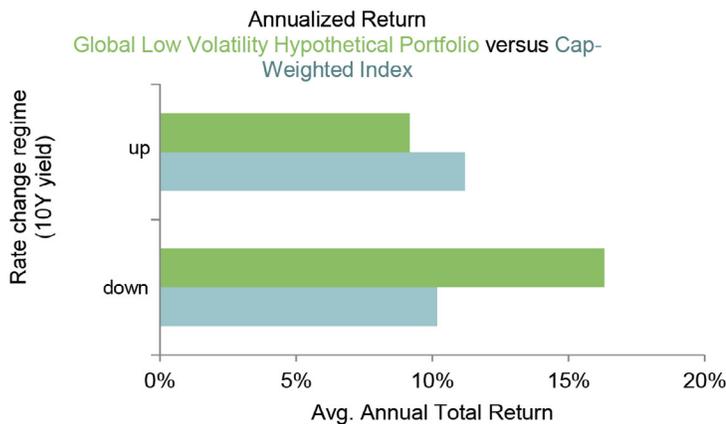
past ten years. Though the expectation of interest rates increasing further might be widespread, generally central banks have indicated that this will only happen if the economy supports it. It’s not far-fetched to believe that even if low volatility strategies might trail the broad market index in such an environment, they will still deliver sufficient total return for investors to meet their goals with similar or lower volatility. Conversely, interest rate expectations not coming true might lead to or result from an environment in which low volatility strategies have historically performed well.

Performance shown is of a hypothetical investment strategy, gross of fees, taxes and transaction costs.

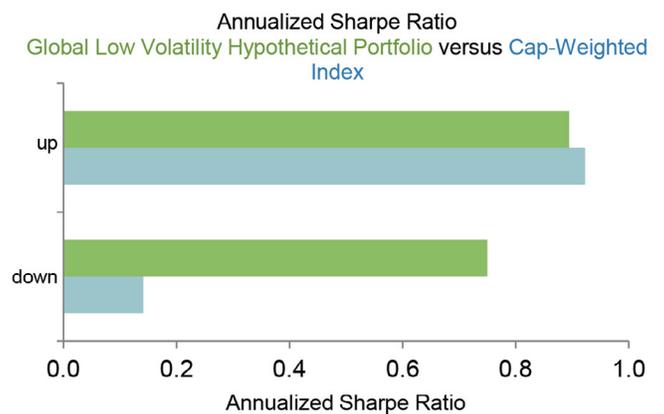
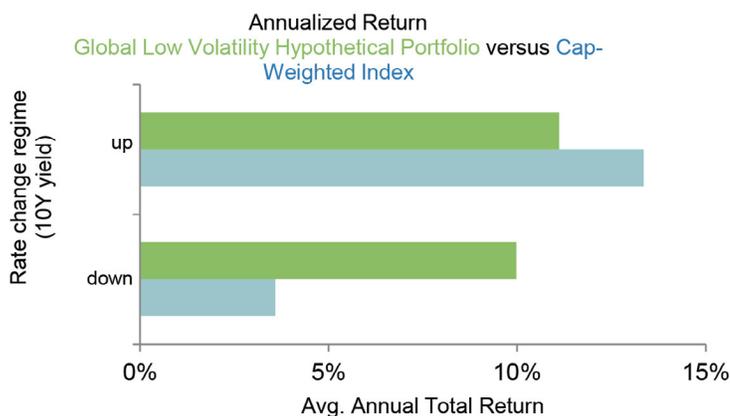
**The Recent Backdrop**

Developed Markets equities continued their multi-year upward trend during 2014, albeit in fits and starts. The MSCI World index gained a modest 5.50% in USD terms, including gross dividends. The Global Low Volatility Portfolio outperformed, returning 8.41% for the year with lower monthly volatility to boot (6.47%, compared to 8.56% for the Cap-Weighted Index).<sup>6</sup>

January 1, 1980 – March 31, 2014



March 1, 2004 – March 31, 2014



**Exhibit 6: Concurrent Rate Change Regime**

Performance shown is of a hypothetical investment strategy, gross of fees, taxes and transaction costs.

Predictive Indicator	Value	Percentile (vs. History, 100=highest)
DIV spread (standardized)	.07	7
BP spread (standardized)	-0.09	17
EP spread (standardized)	0.05	21

#### Exhibit 7: Recent Backdrop (as of December 31, 2014)

History relates to the period January 1, 1980, to December 31, 2014.

Exhibit 7 considers the relative valuation of the Global Low Volatility Portfolio, which was priced about at par with the broad market at the time of writing. Compared to the discount at which this portfolio has historically traded, this is indeed expensive. However, we have seen that this primarily reflects the strategy's macro positioning and has not been a good predictor of its impending performance.

The market rally could certainly have legs if economic fundamentals continue to improve. However, this might prompt the Fed to normalize its interest rate policy, potentially tempering the upside. Conversely, if economic growth disappoints, a correction might ensue as investors may conclude markets have gotten ahead of fundamentals. The risk might be asymmetric, and we note the Global Low Volatility Portfolio has historically performed relatively well compared to the Cap-Weighted Index during moderate up markets and during down markets.

#### Conclusions

Investors understand the appeal of low volatility equity investing but have expressed concerns about the tactical timing of making an allocation, primarily related to valuation levels and the interest rate environment. We have illustrated that valuation levels of the Global Low Volatility Portfolio primarily reflect its dynamic country and sector positioning more than the valuation of its existing holdings. This can explain its relative valuation being a poor predictor of its future relative performance. Our research showed that the Global Low Volatility Portfolio has tended to underperform during periods of rising interest rates. However, rate increases don't happen in isolation and in such a rising rate environment the strategy may still deliver the total return needed for investors to achieve their goals, while reducing volatility. We believe these are relevant considerations for investors looking to make an allocation to low volatility equities at this time.

#### Endnotes

This paper has benefited greatly from useful comments and discussions with Janet Campagna, Rosemary Macedo, Adam Petryk, Colm O'Conneide and Heena Doshani. The authors thank Sarah Reifsteck and Nicole Phan for careful editing and Harish Suyal for data support.

1. For an overview thereof, see Baker, M., B. Bradley, and J. Wurgler. "Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly." *Financial Analysts Journal*, vol. 67, no. 1, 2011.
2. For a comparison thereof, see for example C. Walkshäusl, "International Low-Risk Investing," *Journal of Portfolio Management*, Fall 2014.

3. See the Appendix for a detailed description of the construction process of the hypothetical Global Low Volatility Portfolio and the Cap-Weighted Index considered in this analysis.
4. De Boer, S., Campagna, J. and J. Norman, "Country and Sector Drive Low-Volatility Investing in Global Equity Markets," *Journal of Index Investing*, Spring 2014.
5. We emphasize that this insight might be specific to the top-down implementation of the Global Low Volatility Portfolio, which may be less sensitive to "crowding" in individual low volatility stocks.
6. The reported return is for the top-down implementation of low volatility equity investing analyzed in this paper. The MSCI World Minimum Volatility Index return was even higher at 12.06%, likely due to a higher weight to US equities resulting from its 5% maximum active weight constraint versus the parent index, while the USD rallied.
7. De Boer, S., Campagna, J. and Norman J., "Country and Sector Drive Low-Volatility Investing in Global Equity Markets," *Journal of Index Investing*, Spring 2014.

#### Appendix: Description of the Global Low Volatility Portfolio Construction and the Capitalization-Weighted Index

To conduct this research, we created a hypothetical Global Low Volatility Portfolio by allocating capital among country-sector sub-indices which are cap-weighted baskets of the stocks in market segments of the MSCI World Developed Markets Index, e.g. US HealthCare, UK Telecommunications or Japanese Consumer Staples. A recent study we performed shows that such a top-down approach to low volatility investing historically delivered the same performance benefits as low volatility stock selection, with some implementation benefits.<sup>7</sup>

The construction process of the Global Low Volatility Portfolio is iterative to temper reliance on historical returns and to seek a diversified portfolio across countries, sectors and individual stocks. First, we created a portfolio of country-sector baskets with the lowest predicted risk, based on the trailing 5-year covariance matrix of weekly returns. Each country-sector basket had to meet certain minimum-liquidity constraints (measured by its aggregate market capitalization) in order to be eligible for inclusion. The resulting portfolio had to be sufficiently diversified based on the Herfindahl index – a measure of concentration. If not, we created a second portfolio with the lowest predicted risk among those country-sector baskets not yet selected, and equal-weighted between the two hypothetical low volatility portfolios. If that portfolio was sufficiently diversified it was used, if not a third low volatility portfolio was included in the mix based on the as-of-yet unselected country-sector baskets and equal-weighted with the other two hypothetical low-volatility portfolios. No more than a blend of three hypothetical non-overlapping low-volatility portfolios was ever required during the creation period (back-test and latest reading: January 1, 1980 to December 31, 2014) to meet our requirements for sufficient diversification. The Global

Low Volatility Portfolio was rebalanced on a quarterly basis. The Capitalization-Weighted Index represents the constituents of the MSCI World Developed Markets Index weighted by their free-float market capitalization, recalculated on a monthly basis.

#### Appendix: Indicator Definitions

The definitions of the indicator variables used in this research are as follows:

For all country-sector indices in our investable universe, we calculated the dividend yield, earnings yield and book-to-price ratio. Each month, we cross-sectionally z-scored these valuations. We used these standardized valuation scores to create the weighted average valuation score of the Global Minimum Volatility Portfolio and the Cap-Weighted Index, and used the month-end differences as the valuation spreads.

Trailing inflation was measured as the Year over Year (henceforth YoY) percentage change in OECD's price index, lagged by 1 month.

Real GDP growth was measured as the YoY change in the OECD's Gross Domestic Product by Expenditure in Constant Prices, lagged by a quarter. An adjustment was made for growth in non-OECD member states using World Bank data.

The trailing interest rate change was measured as the YoY difference in medium-term sovereign rates. Starting in 1991, we used the Barclays Global Aggregate Bond index yield. Before that, we used the 10Y US treasury rate.

Data was sourced from MSCI (country-sector index returns as well as valuation data), Datastream (return data for low volatility portfolio construction, interest rate data), the OECD and the World Bank (inflation, global economic growth).

#### Disclaimer

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Sanne de Boer is a Senior Analyst in the Global Equities Research team at QS Investors in New York. At QS Investors, he develops tools for systematic asset management and is responsible for alpha modeling, smart beta strategies, portfolio construction, as well as risk reporting and performance attribution. Prior to joining QS Investors, he performed a similar role at ING Investment Management and held positions measuring and managing various types of risk at Citigroup and American Express. He has served as an Adjunct Assistant Professor of Decision Modeling at NYU's Stern School of Business. His research has been published in leading academic and practitioner journals.

Sanne earned an M.S. in Mathematics and an M.A. in Econometrics, cum laude, from the Vrije Universiteit in Amsterdam and received a Ph.D. in Operations Research from the Massachusetts Institute of Technology. He also holds the Chartered Financial Analyst designation.



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